



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2002AK4B

Title: Molecular characterization of organic matter in soil leachates from the Caribou Poker Creeks Watershed

Project Type: Research

Focus Categories: Hydrology Methods Groundwater

Keywords: Permafrost, hydrology, organic geochemistry

Start Date: 03/01/2003

End Date: 02/28/2004

Federal Funds Requested: \$24018.00

Matching Funds: \$10273.00

Congressional District: Alaska

Principal Investigators: White, Daniel M.

Abstract: The Caribou and Poker Creeks Watershed (CPCRW) is an important component of the Bonanza Creek LTER (Long Term Ecological Research) Program. The CPCRW serves as a testbed for process studies on interactions between hydrology, meteorology and permafrost. By characterizing the nature and origin of organic matter in water leaching from soil it will be easier to identify the source of water above and below permafrost, in interpermafrost springs and in streams. In addition to a better understanding of the hydrology of permafrost watersheds in general, understanding the origin and character of organic matter is important to understanding the potential for contaminant transport in permafrost dominated watersheds. Depending on the origin of the organic matter, contaminants may be sequestered in the soil or mobilized, reappearing in drinking water wells far downgradient. NOM in soil leachate and springwater from the CPCRW is being fingerprinted using pyrolysis-GC/MS as part of a current USGS/WERC project. In addition to the molecular characterization, a study is being conducted to evaluate the potential for organic matter in the CPCRW to transport heavy metal contaminants. In this proposal, we seek to continue work using fingerprints from soil leachates to help identify infiltration areas for water emerging in springs and streams throughout the CPCRW. This will be accomplished by fingerprinting soil leachates, then statistically comparing the fingerprints to those from spring, stream

and well water samples already processed. Furthermore, fingerprints from the soil leachates will be used to estimate the potential for waters derived from different infiltration areas to mobilize contaminants.

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WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2002AK5B

Title: Investigation of Fouling in Membrane Bioreactors for Wastewater Treatment

Project Type: Research

Focus Categories: Waste Water

Keywords: fouling, membrane bioreactors, wastewater

Start Date: 03/01/2003

End Date: 02/28/2004

Federal Funds Requested: \$20871.00

Matching Funds: \$17306.00

Congressional District: Alaska

Principal Investigators: Schiewer, Silke (University of Alaska Fairbanks, WERC (Water & Environmental Research Center))

Abstract: The use of membrane bioreactors in wastewater treatment can reduce the amount of contaminants discharged into sensitive Alaskan ecosystems. The process of membrane bioreactors for wastewater treatment offers the advantage of a very high effluent quality. Membrane fouling, which can cause operational problems, is the major challenge that this innovative technology faces. Therefore, research is necessary to alleviate this problem. The proposed project will contribute to a better understanding of reasons for fouling and investigate strategies to reduce fouling, for example by air sparging. In the first phase of this project, a membrane bioreactor equipped with an air sparging unit has been designed and manufactured, and is now operational. This reactor will be utilized for further investigations during the second phase of the project. Improved membrane bioreactor operation is expected to lead to an increased use of this environmentally beneficial technique.

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